Lesions in Female Rats B-29

TABLE B4
Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talca

	0 mg/m ³	6 mg/m ³	18 mg/m ³
Di			
Disposition Summary		50	50
Animals initially in study	50		50
Early deaths		•	~
Moribund	28	17 19	27 14
Natural deaths	11	19	14
Survivors Terminal sacrifice	••	10	9
	11	13	9
Missing		1	
Animals examined microscopically	50	49	50
Alimentary System			
Intestine large, cecum	(46)	(34)	(43)
Hemorrhage, focal	(,	1 (3%)	()
Inflammation	11 (24%)	1 (3%)	6 (14%)
Parasite metazoan	7 (15%)	3 (9%)	6 (14%)
Ulcer	1 (2%)	1 (3%)	1 (2%)
Intestine large, colon	(48)	(41)	(45)
Inflammation	(.0)	1 (2%)	2 (4%)
Parasite metazoan	2 (4%)	3 (7%)	3 (7%)
intestine large, rectum	(38)	(37)	(41)
Inflammation	4 (11%)	(51)	(4-)
Parasite metazoan	2 (5%)	1 (3%)	1 (2%)
Intestine small, duodenum	(48)	(44)	(47)
Necrosis, focal	1 (2%)	(++)	(47)
Intestine small, ileum	(44)	(32)	(38)
Hyperplasia, lymphoid	2 (5%)	(32)	(33)
Liver	(50)	(48)	(50)
Atrophy	(30)	1 (2%)	1 (2%)
Basophilic focus	27 (54%)	17 (35%)	21 (42%)
Clear cell focus	1 (2%)	2 (4%)	1 (2%)
Cyst multilocular	1 (2%)	= (4,2)	1 (210)
Degeneration, cystic	. (5%)	2 (4%)	1 (2%)
Eosinophilic focus	2 (4%)	5 (10%)	4 (8%)
Fatty change	18 (36%)	18 (38%)	14 (28%)
Hematopoietic cell proliferation	1 (2%)	(50%)	. 2570)
Infiltration cellular, mononuclear cell	- (=)		1 (2%)
Inflammation, granulomatous, focal	13 (26%)	3 (6%)	4 (8%)
Inflammation, necrotizing, focal	(/-)	1 (2%)	(570)
Inflammation, suppurative	1 (2%)	1 (270)	
Necrosis, focal	5 (10%)	1 (2%)	2 (4%)
Pigmentation, hemosiderin	1 (2%)	- (2/0)	= (.70)
Thrombosis	- (=)		1 (2%)
Bile duct, hyperplasia	36 (72%)	38 (79%)	36 (72%)
Centrilobular, atrophy	22 (.2.0)	2 (4%)	6 (12%)
Centrilobular, degeneration	10 (20%)	14 (29%)	10 (20%)
Centrilobular, necrosis	2 (4%)	2 (4%)	2 (4%)
Hepatocyte, atrophy, focal	- ()	2 (370)	1 (2%)
Serosa, thrombosis		3 (6%)	- (=70)
Mesentery	(1)	(2)	
Granuloma	1 (100%)	1 (50%)	
Inflammation, chronic active	- (20070)	1 (50%)	

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B-30 Talc, NTP TR 421

TABLE B4
Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m ³	6 mg/m ³	18 mg/m ³
Alimentary System (continued)			<u></u>
Pancreas	(50)	(46)	(49)
Hyperplasia, nodular	1 (2%)	(44)	()
Inflammation	. (5%)	1 (2%)	
Lobules, atrophy	7 (14%)	7 (15%)	9 (18%)
Salivary glands	(50)	(48)	(50)
Inflammation	2 (4%)	(40)	(50)
Stomach, forestomach	(50)	(45)	(49)
Hyperkeratosis	1 (2%)	(45)	1 (2%)
Inflammation	1 (2%)		2 (4%)
Mineralization	1 (2%)	1 (2%)	2 (470)
Ulcer	9 (18%)	4 (9%)	3 (6%)
	(50)		(50)
Stomach, glandular Erosion	(30)	(47)	
Inflammation	1 (20%)	1 (20%)	1 (2%)
Mineralization	1 (2%)	1 (2%)	2 (4%)
	2 (4%)	2 (4%)	2 (4%)
Ulcer	3 (6%)	2 (4%)	3 (6%)
Ulcer, multiple	1 (2%)		1 (2%)
Arteriole, muscularis, lamina propria,		1 /0~ \	
mineralization		1 (2%)	
Cardiovascular System			
Blood vessel	(3)	(3)	(1)
Aorta, mineralization	\- /	3 (100%)	1 (100%)
Mesenteric artery, aneurysm	1 (33%)	- (300,0)	- (/
Mesenteric artery, inflammation	3 (100%)		
Mesenteric artery, mineralization	- (,	1 (33%)	1 (100%)
Mesenteric artery, thrombosis	1 (33%)	1 (33%)	- (/
Heart	(50)	(48)	(50)
Cardiomyopathy	35 (70%)	40 (83%)	36 (72%)
Inflammation, focal	1 (2%)	10 (05/0)	1 (2%)
Atrium, thrombosis	5 (10%)	8 (17%)	5 (10%)
Myocardium, embolus	3 (10%)	2 (4%)	3 (10%)
Myocardium, inflammation, focal		1 (2%)	
Myocardium, mineralization	1 (29%)	` -	3 (46%)
Mycarolum, mileranzanon	1 (2%)	4 (8%)	3 (6%)
Endocrine System			
Adrenal gland, cortex	(50)	(47)	(49)
Degeneration, cystic	1 (2%)		
Degeneration, fatty	3 (6%)		
Degeneration, focal	1 (2%)	1 (2%)	
Hyperplasia, diffuse	• •	1 (2%)	1 (2%)
Hyperplasia, focal	9 (18%)	12 (26%)	13 (27%)
Necrosis	• •		2 (4%)
Necrosis, focal	1 (2%)	1 (2%)	` '
Pigmentation, hemosiderin	1 (2%)	• •	
Adrenal gland, medulla	(48)	(47)	(49)
Cyst	1 (2%)	• •	` '
Hyperplasia	20 (42%)	18 (38%)	14 (29%)
Bilateral, hyperplasia	2 (4%)	2 (4%)	2 (4%)
Parathyroid gland	(43)	(42)	(47)
	3 (7%)	4 (10%)	2 (4%)
Hyperplasia			

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Lesions in Female Rats B-31

TABLE B4
Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m^3	6 mg/m ³	18 mg/m ³
Endocrine System (continued)			· · · · · · · · · · · · · · · · · · ·
Pituitary gland	(50)	(47)	(50)
Cyst	2 (4%)	` '	ì (2%)
Pars distalis, hyperplasia	10 (20%)	6 (13%)	4 (8%)
Pars distalis, necrosis	` ,	• •	1 (2%)
Thyroid gland	(50)	(47)	(49) ` ´
C-cell, hyperplasia	10 (20%)	8 (17%)	4 (8%)
General Body System Nonc			
Genital System			
Clitoral gland	(47)	(44)	(46)
Hyperplasia	2 (4%)	(++)	1 (2%)
Inflammation	1 (2%)	1 (2%)	1 (2%)
Ovary	(50)	(47)	(50)
Cyst	5 (10%)	(")	1 (2%)
Uterus	(50)	(48)	(50)
Cyst	1 (2%)	1 (2%)	1 (2%)
Inflammation	1 (2%)	1 (2%)	- (-10)
Endometrium, hyperplasia	3 (6%)	- (2,7)	
Lamina propria, fibrosis	20 (40%)	39 (81%)	19 (38%)
Hematopoietic System Bone marrow	(50)	(43)	(49)
Atrophy	1 (2%)	2 (5%)	1 (2%)
Hyperplasia, histiocytic	1 (2%)		1 (2%)
Inflammation, granulomatous, focal	1 (2%)		0.4690
Myelofibrosis	1 (2%)	3 (7%)	3 (6%)
Necrosis, focal Mycloid cell, hyperplasia	2 (4%)	1 (2%)	2 (60%)
ymph node	2 (4%) (50)	2 (5%) (48)	3 (6%) (50)
Axillary, hemorrhage, chronic	(50)	(48)	(50)
Lymph node, bronchial	(46)	(47)	1 (2%) (47)
Cyst	1 (2%)	(7)	(47)
Fibrosis	- (=,0)	1 (2%)	•
Hemorrhage, chronic		1 (2%)	
Hyperplasia, histiocytic		40 (85%)	45 (96%)
Inflammation, suppurative	1 (2%)	` ,	• • •
Pigmentation, hemosiderin	1 (2%)		
ymph node, mandibular	(47)	(46)	(47)
Hyperplasia, lymphoid		1 (2%)	1 (2%)
Hyperplasia, plasma cell	2 (4%)	1 (2%)	1 (2%)
Inflammation, chronic active	1 (2%)		1 (2%)
Inflammation, suppurative			1 (2%)
ymph node, mediastinal	(47)	(44)	(47)
Hemorrhage, chronic	1 (2%)		
Hyperplasia, histiocytic		33 (75%)	40 (85%)
Hyperplasia, lymphoid	1 (2%)		1 (2%)
Inflammation, chronic active	, ,,,,,,,	. ,,,,,,,,	1 (2%)
Inflammation, suppurative	1 (2%)	1 (2%)	

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B-32 Talc, NTP TR 421

TABLE B4
Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m ³	6 mg/m ³	18 mg/m ³				
Hematopoietic System (continued)							
Lymph node, mesenteric	(49)	(47)	(47)				
Hemorrhage	(47)	1 (2%)					
Hyperplasia, lymphoid	2 (4%)	1 (2%)	2 (4%)				
Hyperplasia, plasma cell	1 (2%)	- (=,0)	2 ()				
Inflammation, chronic active	4 (8%)	1 (2%)					
Inflammation, granulomatous	. (6.6)	- (-70)	1 (2%)				
Spleen	(50)	(48)	(50)				
Atrophy	2 (4%)	2 (4%)	2 (4%)				
Fibrosis, focal	3 (6%)	1 (2%)	1 (2%)				
Hematopoietic cell proliferation	4 (8%)	6 (13%)	7 (14%)				
Hyperplasia, lymphoid	,,	, ,,	1 (2%)				
Inflammation, granulomatous, focal	1 (2%)		` ,				
Pigmentation, hemosiderin	2 (4%)						
Capsule, hemorrhage	` '		1 (2%)				
Thymus	(47)	(44)	(47)				
Inflammation	1 (2%)	` '	` '				
	<u> </u>						
Integumentary System			450				
Mammary gland	(50)	(48)	(50)				
Galactocele		1 (2%)					
Hyperplasia, cystic		2 (4%)					
Lobules, hyperplasia			1 (2%)				
Skin	(50)	(49)	(50)				
Inflammation, focal	1 (2%)		•				
Musculoskeletal System		·					
Bone	(50)	(48)	(50)				
Fibrous osteodystrophy	4 (8%)	3 (6%)	4 (8%)				
Hyperostosis	4 (8%)	1 (2%)	3 (6%)				
Pelvis, fracture	1 (2%)	- ()	- ()				
Vertebra, cyst	1 (2%)						
Nomous Sustam							
Nervous System Brain	(50)	(48)	(50)				
Compression	8 (16%)	(48) 7 (15%)	(50) 9 (18%)				
Hemorrhage	5 (1076)	1 (2%)	1 (2%)				
Hydrocephalus		1 (270)	1 (2%)				
Inflammation, focal		1 (2%)	. (210)				
White matter, necrosis, focal		1 (270)	2 (4%)				
Respiratory System							
агупх	(50)	(48)	(48)				
Inflammation, necrotizing			1 (2%)				
Inflammation, suppurative	2 (4%)	1 (2%)	1 (2%)				
Lung	(50)	(48)	(50)				
Crystals, focal	1 (2%)		a				
Cyst		1 (2%)	5 (10%)				
Cyst, multiple			2 (4%)				
Edema	1 (2%)	40					
Hemorrhage		1 (2%)	1 (2%)				
Hyperplasia, adenomatous, diffuse			2 (4%)				

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Lesions in Female Rats B-33

TABLE B4
Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m ³	6 mg/m ³	18 mg/m ³
Respiratory System (continued)			<u> </u>
Lung (continued)			
Inflammation, granulomatous	2 (4%)	47 (98%)	50 (100%)
Inflammation, suppurative	2 (4%)	1 (2%)	,
Mineralization	- ()	2 (4%)	
Alveolar epithelium, hyperplasia	2 (4%)	27 (56%)	47 (94%)
Alveolus, metaplasia, squamous	2 ()	2. (2.75)	8 (16%)
Bronchus, epithelium, degeneration, focal	1 (2%)		5 (5515)
Interstitium, fibrosis	2 (275)		1 (2%)
Interstitium, fibrosis, focal	1 (2%)	24 (50%)	44 (88%)
Interstitium, mineralization	- (= 10)	1 (2%)	1 (2%)
Peribronchial, hyperplasia, histiocytic		8 (17%)	9 (18%)
Nose	(48)	(45)	(48)
Inflammation, suppurative	(40)	1 (2%)	(10)
Lumen, foreign body		1 (270)	1 (2%)
Mucosa, inflammation, suppurative		3 (7%)	5 (10%)
Nasolacrimal duct, inflammation, suppurative	1 (2%)	3 (170)	3 (10%)
Nerve, developmental malformation	1 (2%)		
Olfactory epithelium, metaplasia	1 (2%)	1 (2%)	
Respiratory epithelium, hyperplasia	1 (2%)		2 (4%)
Respiratory epithelium, metaplasia, squamous	1 (2%)	1 (2%)	2 (476)
Fraches	(50)	1 (2%)	(50)
Inflammation, necrotizing	(30)	(48)	
Inflammation, suppurative	3 (6%)	1 (2%)	1 (2%) 2 (4%)
minimum apparative	3 (0%)		
Special Senses System			1
Eye	(2)		(2)
Cataract	2 (100%)		2 (100%)
Retina, degeneration	2 (100%)		2 (100%)
Harderian gland	(5)	(7)	(15)
Inflammation	4 (80%)	3 (43%)	3 (20%)
Urinary System			
Kidney	(49)	(47)	(49)
Abscess	1 (2%)		` '
Cyst	` '	1 (2%)	1 (2%)
Cyst, multiple	1 (2%)		` '
Embolus, multiple	- ()	1 (2%)	
Infarct	1 (2%)	- ()	
Infarct, multiple	- ()		1 (2%)
Inflammation	1 (2%)	1 (2%)	- ()
Nephropathy	44 (90%)	43 (91%)	42 (86%)
Capsule, inflammation	,	1 (2%)	(52)
Medulla, inflammation		1 (2%)	1 (2%)
Renal tubule, necrosis	1 (2%)	- (5%)	2 (4%)
Jrinary bladder	(50)	(45)	(50)
Inflammation	(-0)	(10)	1 (2%)
ammanar (VI)			. (=,0)

⁴ Incidences are expressed as the ratio of animals with lesions to the number of animals examined microscopically at the site.

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B-34 Talc, NTP TR 421

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C-1

APPENDIX C SUMMARY OF LESIONS IN MALE MICE IN THE 2-YEAR INHALATION STUDY OF TALC

TABLE C1	Summary of the Incidence of Neoplasms in Male Mice	
	in the 2-Year Inhalation Study of Talc	C-3
TABLE C2	Individual Animal Tumor Pathology of Male Mice	
	in the 2-Year Inhalation Study of Talc	C-6
TABLE C3	Statistical Analysis of Primary Neoplasms in Male Mice	
	in the 2-Year Inhalation Study of Talc	C-24
TABLE C4	Summary of the Incidence of Nonneoplastic Lesions in Male Mice	
	in the 2-Year Inhalation Study of Talc	C-28

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C-2 Talc, NTP TR 421

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Lesions in Male Mice

TABLE C1
Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Inhalation Study of Talc^a

	0 mg/m ³	6 mg/m ³	18 mg/m ³
Disposition Summary			
	50	50	50
Animals initially in study	30	30	30
Early deaths	1	2	3
Moribund			14
Natural deaths	16	18	14
Survivors	••	••	20
Terminal sacrifice	30	28	32
Missexed	1	1	0
Missing	2	1	1
Animals examined microscopically	46	47	49
Alimentary System			
Gallbladder	(31)	(29)	(35)
Intestine large, colon	(36)	(38)	(39)
Intestine large, colon	(32)	(30)	(34)
intestine small, ileum	(33)	(32)	(35)
Adenocarcinoma	(30)		(33)
Liver	(45)	1 (3%) (47)	(48)
Hemangiosarcoma	• •	(~')	
Hemangiosarcoma, metastatic, spieen	1 (2%)		1 (2%)
Hepatocellular carcinoma	1 (2%)	\$ (110%)	11 /22%\
Hepatocellular darcinoma	6 (13%) 1 (2%)	5 (11%) 8 (17%)	11 (23%)
Hepatocellular adenoma, multiple	1 (2%)	8 (17%)	4 (8%)
Pancreas	2 (4%)	1 (2%)	(42)
	(42)	(39)	(42)
Hepatocellular carcinoma, metastatic, liver	1 (2%)	446	4455
Salivary glands	(45)	(46)	(47)
Stomach, glandular	(39)	(43)	(43)
Cardiovascular System			
Heart .	(45)	(46)	(49) /
Alveolar/bronchiolar carcinoma, metastatic,		(1-)	()
lung			1 (2%)
Endocrine System			
Adrenal gland	(43)	(46)	(47)
Spindle cell, adenoma	(43) 1 (2%)	(46) 1 (2%)	(47) 1 (2%)
Adrenal gland, cortex	(43)		
Adenoma	(43)	(46) 1 (2%)	(47) 1 (2%)
Adrenal gland, medulla	(39)	(39)	
Pheochromocytoma malignant	1 (3%)	(37)	(42)
r necentomocytoma mangnant ituitary gland	(44)	(44)	(46)
Adenoma		(44)	(46)
Pars intermedia, adenoma	1 (2%)	2 (50%)	
Pars intermedia, adenoma Phyroid gland	(45)	2 (5%)	(45)
Follicular cell, adenoma	(43)	(46)	(45) 2 (4%)
General Body System			
Cissue NOS		(3)	(2)
		(0)	(=)
Hemangioma			1 (50%)

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C-4 Talc, NTP TR 421

TABLE C1
Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Inhalation Study of Talc (continued)

	0 mg/m ³	6 mg/m ³	18 mg/m ³
Genital System			
Epididymis	(39)	(39)	(42)
Prostate	(40)	(43)	(44)
Seminal vesicle	(41)	(43)	(39)
Testes Hemangiosarcoma	(43) 1 (2%)	(44)	(45)
Hematopoietic System			
Bone marrow	(40)	(42)	(43)
Hemangiosarcoma, metastatic, spleen	1 (3%)	40	(40)
Lymph node	(45)	(46)	(48)
Lymph node, bronchial Alveolar/bronchiolar carcinoma, metastatic, lung	(32)	(39)	(44) 1 (2%)
Lymph node, mandibular	(23)	(23)	(19)
Hemangiosarcoma, metastatic, spleen	` '	, ,	ì (5%)
Lymph node, mediastinal	(9)	(10)	(7)
Lymph node, mesenteric	(36)	(39)	(40)
Hemangiosarcoma, metastatic, spleen	***		1 (3%)
Spicen	(44)	(44)	(47)
Hemangiosarcoma	2 (5%)	(22)	2 (4%)
Thymus Alveolar/bronchiolar carcinoma, metastatic.	(34)	(33)	(40)
lung			1 (3%)
Integumentary System None			
None			
None Musculoskeletal System	(46)	(AT)	/40)
Musculoskeletal System Bone	(46)	(47)	(49) 1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen	(46)	(47)	1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle	(46)	(47)	
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen	(46)	(47)	1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma,	(46)	(47)	1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None	(46)	(47)	1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System		(47)	1 (2%) (1) 1 (100%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None	(46) (45) 6 (13%)		1 (2%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple	(45) 6 (13%)	(47) 4 (9%)	(48) 7 (15%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma	(45) 6 (13%) 6 (13%)	(47)	(48) 7 (15%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma, multiple	(45) 6 (13%) 6 (13%) 1 (2%)	(47) 4 (9%)	(48) 7 (15%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver	(45) 6 (13%) 6 (13%)	(47) 4 (9%)	(48) 7 (15%) 2 (4%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver Hemangiosarcoma, metastatic, spleen	(45) 6 (13%) 6 (13%) 1 (2%)	(47) 4 (9%) 2 (4%)	(48) 7 (15%) 2 (4%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver	(45) 6 (13%) 6 (13%) 1 (2%)	(47) 4 (9%)	(48) 7 (15%) 2 (4%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver Hemangiosarcoma, metastatic, spleen Hepatocellular carcinoma, metastatic, liver	(45) 6 (13%) 6 (13%) 1 (2%) 1 (2%)	(47) 4 (9%) 2 (4%)	(48) 7 (15%) 2 (4%) 2 (4%) 2 (4%) 2 (4%)
Musculoskeletal System Bone Hemangiosarcoma, metastatic, spleen Skeletal muscle Thoracic, alveolar/bronchiolar carcinoma, metastatic, lung Nervous System None Respiratory System Lung Alveolar/bronchiolar adenoma Alveolar/bronchiolar adenoma, multiple Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver Hemangiosarcoma, metastatic, spleen Hepatocellular carcinoma, metastatic, liver	(45) 6 (13%) 6 (13%) 1 (2%)	(47) 4 (9%) 2 (4%)	(48) 7 (15%) 2 (4%) 2 (4%)

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Lesions in Male Mice C-5

TABLE C1
Summary of the Incidence of Neoplasms in Male Mice in the 2-Year Inhalation Study of Talc (continued)

	0 mg /m³	6 mg/m ³	18 mg/m ³
Urinary System			
Kidney	(45)	(46)	(48)
Carcinoma, metastatic, uncertain primary site	1 (2%)		
Urinary bladder Sarcoma	(43) 1 (2%)	(38)	(43)
Systemic Lesions	<u></u>		
Multiple organs ^b	(46)	(47)	(49)
Lymphoma malignant lymphocytic		1 (2%)	
Lymphoma malignant mixed	2 (4%)		
Lymphoma malignant undifferentiated cell	3 (7%)		
Tumor Summary			
Total animals with primary neoplasms ^c	26	20	28
Total primary neoplasms	36	26	38
Total animals with benign neoplasms	11	16	18
Total benign neoplasms	12	17	22
Total animals with malignant neoplasms	20	8	15
Total malignant neoplasms	24	9	16
Total animals with metastatic neoplasms	4	1	4
Total metastatic neoplasms	5	1	11
Total animals with malignant neoplasms,			
uncertain primary site	1		

a lucidences are expressed as the ratio of animals with lesions to the number of animals examined microscopically at the site.

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Number of animals with any tissue examined microscopically

^c Primary tumors: all tumors except metastatic tumors

Talc. NTP TR 421 C-6 TABLE C2 Individual Animal Tumor Pathology of Male Mice in the 2-Year Inhalation Study of Talc: 0 mg/m3 0 4 4 4 4 5 5 5 5 5 5 5 6 6 6 7 7 7 7 7 7 7 7 8 8 8 7 8 1 3 3 3 3 3 3 Number of Days on Study 3 3 8 8 1 4 7 2 0 Carcass ID Number 3 9 5 1 7 7 9 0 1 9 8 1 2 9 5 1 6 6 7 5 3 3 5 7 1 4 Alimentary System Esophagus M M + M + + + + + M + M + + +Gallbladder $M\ M\ M\ M\ A\ A\ A\ A\ M\ +\ +\ A\ A$ Α Intestine large A + A A A A A A A + + A + A + A A A A A A A + A A A + + A + Intestine large, cecum Intestine large, colon A + A A A A A A A + + A + Intestine large, rectum A + A A A A A A A A + A A M M + A +Intestine small A + A A A A A A A + A A A +Intestine small, duodenum **A A A A A A A A + A A A +** A + A A A A A A A + A A A A + + + Intestine small, ileum Intestine small, jejunum A + A A A A A A A + A A A A + Α Liver Hemangiosarcoma Hemangiosarcoma, metastatic, spleen Hepatocellular carcinoma \mathbf{x} Х x x xHepatocellular adenoma Hepatocellular adenoma, multiple Hepatocellular carcinoma, metastatic, liver Salivary glands + Stomach + + Stomach, forestomach + I + + M + Stomach, giandular Cardiovascular System Heart **Endocrine System** Adrenal gland Spindle cell, adenoma Adrenal gland, cortex Adrenal gland, medulia Pheochromocytoma malignant Islets, pancreatic M + I + + M + A + M + A + I M IParathyroid gland Pituitary gland +++++++ Adenoma Thyroid gland +: Tissue examined microscopically M: Missing tissue X: Lesion present

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A: Autolysis precludes examination

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Blank: Not examined

l: Insufficient tissue

Lesions in Male Mice

TABLE C2		
Individual Animal Tumor Pathology	of Male Mice in the 2-Year Inhalation	Study of Talc: 0 mg/m ³ (continued)

Michigan I and a factor of the same of the													_			_							`			
Number of Days on Study	7 3 6	7 3 7	7 3 7	7 3 7	7 3 7	7 3 7	7 3 7		3	7 3 8	7 3 8	7 3 8	7 3 8	7 3 9	3	7 3 9	7 3 9	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0	4	7 4 0		
Carcass ID Number	3 9 2 1	3 9 8 1	4 0 2 1	4 0 3 1	4 2 1	4 2 3 1	4 2 4 1	_		4 5 1	4 5 2 1	4 5 8 1	4 6 4 1		4 8 8 1	4 9 2 1	5 1 3 1	3 9 3 1	4 2 6 1	4 2 7 1	4 8 2 1	4 8 4 1	5 2 0 1	5 2 1 1		Total Tissues Tumors
Alimentary System																										
Esophagus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		41
Galibladder	·	÷	÷	M	÷	÷	÷	<u>.</u>	+	÷	÷	÷	÷	÷		÷	+	÷	+	<u> </u>	<u>.</u>	+	+	4		31
Intestine large	i	÷	÷	+	÷		÷	<u>.</u>	÷	÷	÷	÷	÷	÷	÷	÷	<u>.</u>	+	+	+	+	+	+	+		36
Intestine large, cecum	·	i		ì	÷	÷	÷	÷	<u>.</u>			÷	÷	<u>.</u>	÷	÷	÷	÷	+	+	+	+	+	+		34
Intestine large, colon		+			_	1	Ĭ	1	1	1	ï	i	ż		Ι	ż	i	i	÷	÷	i	·	÷	÷		36
	Ţ			I	T	T	Ι	Ι	Ŧ	T	I	+	Ĭ	Ι	Ι	_	Ι	T	Ι					+		32
intestine large, rectum Intestine amali		7	7	7	Ţ	<u> </u>	Ţ	Ţ	⊤	1	Ι	Ι	Τ	7	7	T	T	Ţ	T	Ţ		_ T		+		34
	.	+	7	_	7	7	7	Τ.	7	7	7	7	•		*	Τ.	7	7	Τ.	7	7	Ŧ	7	+		32
Intestine small, duodenum	+	+	+	+	+	+	+	+	+	+	*	•	*	M	+	+	+	*	Ξ	7	•	+	7			33
Intestine small, ileum	+	+	+	+	+	*	*	+	+	+	+	+	+	+	+	+	+	+	7	Ţ	*			+		33 32
intestine small, jejunum	+	+	+	+	+	+	M	+	+	*	+	+	+	+	+	+	+	*	+	+	+	*	+	+		32 45
Liver	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Hemangiosarcoma																										1
Hemangiosarcoma, metastatic, spiecn								Х																		1
Hepatocellular carcinoma																										6
Hepatocellular adenoma															X											1
Hepatocellular adenoma, multiple					X								X													2
Pancreas Hepatocellular carcinoma, metastatic,	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		42
liver																										1
Salivary glands	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		45
Stomach	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		45
Stomach, forestomach	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		43
Stomach, glandular	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	I		39
Cardiovascular System																										
Heart	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	•	45
Endocrine System																										
Adrenal gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		43
Spindle cell, adenoma																						X				1
Adrenal giand, cortex	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		43
Adrenal giand, medulia	+	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	+	+	+	+		39
Pheochromocytoma malignant																				X						1
Islets, pancreatic	+	+	+	+	+	M	1	I	+	+	+	+	M	I	I	M	+	1	+	+	1	+	M	+		26
Parathyroid gland	+	+	M	+	+	+	M	+	+	+	M	M	+	+	+	M	M	M	M	M	+	+	+	M		25
Pituitary gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1	+	+	+	+	+	+		44
																										1
Adenoma Thyroid gland																										

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C-8 Talc, NTP TR 421

			_			_		_	_						tuć	_		_	_				
	0	4	4	4	4	5	5	5	5	5	5	5	6	6	6	7	7	7	7	7	7	7	
Number of Days on Study						1										1		3	3	3	3	_	
	8	2	7	4	6	8	3	1	9	5	7	7	9	7	4	0	6	6	6	6	6	6	
	4		4	5	3	3	4	4	- 5	3	4	5	5	4	4	5	3	3	3	3	3	3	
Carcass ID Number	3	9	5	1	7	7	9	0	1	9	8	1	2	9	5	1	6	6	6	7	7	7	
	5	1	4	2	4	2	4	5	5	5	9	8	3	3	5	7	1	4	7	0	1	5	
	1	1	1			1						1	1	1	1	1	1	1	1	1	1	1	
General Body System None																							
Genital System																							
Epididymis	+	+	+	M	(+	+	+	+	+	+	+	+	+	+	М	+	+	M	+	+	M	1	
Preputial gland			+								+	+		+			+						
Prostate	M	i +	M	M	+	I	+	+	+	+	+	+	+	+	I	+	+	+	+	+	+	+	
Seminal vesicle	+	-	+	A	+	M	+	+	+	+	+	Α	Α	+	+	Α	+	+	+	+	+	+	
Tala	Α	. +	+	M	+	+	+	Α	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Hemangiosarcoma .									•														
lematopoletic System		-					_	_	_		_								-	-			
Bone marrow	A	_		_	_	A	_		_	Δ	_	Δ	_	_	_	_	_	_	_	_	_	_	
Hemangiosarcoma, metastatic, spleen			Λ	•	•	A	,		1	·	•	^	•	•	•	•	•	,	7	•	•	•	
Lymph node	M	i 4	. +	_	4	4	_	4	_	_	_	_	_	_	_	_	_	_	_	_	_	4	
Lymph node, bronchial			•		۰	+	м	<u>.</u>	÷	ï	÷	ĭ	1	_	·	·	Ţ.	+	4	+	+	÷	
Lymph node, mandibular						M															-		
Lymph node, mediastinal						M																	
Lymph node, mesenteric						M																	
Spicen						+			+				+			<u>.</u>	1		4	<u>.</u>		+	
Hemangiosarcoma	••	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	
Thymus	M	1	M	M	+	M	M	A	+	M	+	+	+	I	+	+	M	+	+	+	+	+	
ntegumentary System	-						_		_									_	_		_	_	
Mammary gland	M	N	M	[M	M	М	м	+	м	+	м	1	м	м	м	м	м	м	м	м	м	М	
Skin			+			+	+		+				+							+	+	+	
									_				_			_		_	_	_		_	····
lusculoskeletal System																							
Bone	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
ervous System											_	-	_										· · · · · · · · · · · · · · · · · · ·
Brain																							

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Lesions in Male Mice																										C-9
TABLE C2 Individual Animal Tumor Pathology of	of Ma	le i	Mi	œ	in	the	e 2	-Ye	ear	II	hs	ıla	tio:	n S	Stu	ду	of	Ta	alc:	0	m	g/o	1 ³ (COL	atinued)	
Number of Days on Study	3	7 3 7	7 3 7				7 3 7		7 3 8		7 3 8		7 3 8		7 3 9		7 3 9	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0		
Carcass ID Number	9	3 9 8 1	4 0 2 1	4 0 3 1	4 2 1 1	4 2 3 1	4 2 4 1	4 3 1 1	4 3 4 1	4 5 1	_		4 6 4 1		8	4 9 2	_			4 2 7 1	4 8 2 1	4 8 4 1	2	5 2 1 1		Total Tissues/ Tumors
General Body System None						-																				
Genital System Epididymis	+	_	_	+	_	_	+	+		+	+	+	+	+	+	м	+	+	+	+	м	+	+	+		39
Preputial gland	•	·	•	Ť	•		•	•	•	•	•	·	·	·	•		•				+	+	+			8
Prostate	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+		40
Seminal vesicle	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		41
Testes	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		43
Hemangiosarcoma																		X								1
Hematopoietic System																										
Bone marrow	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		40
Hemangiosarcoma, metastatic, spleen								X																		1
Lymph node	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		45
Lymph node, bronchial	1		M		+	+	+	M			+	+	+		M									M		32
Lymph node, mandibular				M		+	+ M	+	+	+	+	+	+	+					+							23 9
Lymph node, mediastinal Lymph node, mesenteric	M	. M	M	M	+	M +	M +	M +		+	+	M +		M I		+		+	M.	+	M +	M	+			36
Spleen		I	Ι		I	+		-	+		+	+	+	-	M		Ι		Ι		<u> </u>			+		44
Hemangiosarcoma	•	•	•	7	•	•	•		X		•	•	•	•		7	•	•	•	•	•	•	•	•		2
Тпутив	1	+	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+	+	+	+	+	+		34
Integumentary System																								_		
Mammary gland	M	M	М	M	M	M	M	M	M	M	M	M	+	M	M	M	M	+	M	+	M	I	M	M		5
Skin	+	+	+	+	+	+	+	+	+	+	I	+	+	+	+	+	+	+	+	+	+	+	+	+		44
Musculoskeletal System																										
Bone	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		46
Nervous System Brain	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		46

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TABLE C2 Individual Animal Tumor Pathology o	f Ma	le :	Mi	œ	in	the	: 2	·Ye	:ar	Ìr	ha	lat	tior	a S	itue	ły	of	Tε	ılc	0	mį	g/m	1 ³ (continued)
Number of Days on Study	-	4 3 2	-	8	4 8 6	5 1 8	4	7	7	5 8 5	5 8 7	8	_	6 7 7	6 8 4	1	3	3	7 3 6	3	7 3 6	3	
Carcass ID Number	4 3 5 1	3 9 1 1	4 5 4 1	5 1 2 1	3 7 4 1	3 7 2 1	-		-		4 8 9 1	5 1 8 1	_		4 5 5 1	-	6	6	3 6 7 1	7 0	7	7	
Respiratory System Laryux Lung Alveolar/bronchiolar adenoma	A	. +	+	++	++	++	+	A +	++	+	+	++	++	++	÷ +	++	+	++	+ + X	1 +	++	+	
Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma, multiple Hemangiosarcoma, metastatic, liver																X		x					
Nose Trachea	+ A	+	+ A	+	+	+	+	+	+	+	+	+	+	+	+	+ A	+	+	+	+	+	+	
Special Senses System Ear Harderian gland Adenoma								-					_		•		-						
Jrinary System Kidney Carcinoma, metastatic, uncertain	A	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
primary site Urinary bladder Sarcoma	A	+	+	A	+	+	+	A	X +	+	+	*	+	+	+	+	+	+	+	+	+	+	
ystemic Lesions Multiple organs Lymphoma malignant mixed Lymphoma malignant undifferentiated cell type	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

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Lesions in Male Mice C-11

TABLE C2	
individual Animal Tumor Pathology of Male Mice in the 2-Year Inhalation Study of Talc: 0 mg/m³ (co	ntinued)

		_	_		_	_		_	_	_		_	_		_	_	_	_	_	_	_		_	_		
Number of Days on Study	7 3 6	7 3 7	7 3 7	7 3 7	7 3 7	7 3 7	7 3 7	-	7 3 8	7 3 8	-	7 3 8	-	-	7 · 3 : 9 :		7 3 9	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0	7 4 0		
	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4 4		-	3	4	4	4	4	5	5		Total
Carcass ID Number	2	8	2	3	1 1	3	4	1	3 4 1	1	2	5 8 1	6 4 1		8 9 8 2 1 1	•	3	9 3 1	2 6 1	2 7 1	2	4	2 0 1	2 1 1		Tissues Tumors
Respiratory System			_							_					_			_		_						
Larynx	1	+	+	+	+	+	+	+	+	+	+	+	+ .	+	+ -	+	+	+	+	+	+	+	+	+		42
Lung Alveolar/bronchiolar adenoma	+	+	+	+	*	+	+ X	+	+	+	+ X	+ ~	+	+	+ •	٠	+	+	+	+	+	+	+	+		45 6
Alveolar/bronchiolar carcinoma Alveolar/bronchiolar carcinoma,	x		x	x	^		^				^	^							x		X			x		6
multiple																										1
Hemangiosarcoma, metastatic, liver			_																							1
Nose Trachea	+	+	H M	+	+	+	+	+	+	+	+	+	+ -	+	+ •	+	+	+	+	+	+	+	+	+		45 42
Special Senses System									_	_				_												
Ear																					+					1
Harderian gland Adenoma																		+ X								1
Urinary System							_	_						_											_	
Kidney Carcinoma, metastatic, uncertain primary site	+	+	+	+	+	+	+	+	+	+	+	+	+ •	+	+ -	۲	+	+	+	+	+	+	+	+		45
Urinary bladder Sarcoma	+	+	+	+	+	+	+	+	+	+	+	+	+ ·	+	+ -	٠	+	+	+	+	+	+	+	+		1 43 1
Systemic Lesions					_			•							,,				-							 -
Multiple organs Lymphoma malignant mixed	+	+	+	+	+	+	+	+	+		+ X	+ .	+ •	+	+ -		+ X	+	+	+	+	+	+	+		46 2
Lymphoma malignant undifferentiated cell type			x																							

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C-12 Talc, NTP TR 421

TABLE C2 Individual Animal Tumor Pathology	of Ma	le	M	ice	in	the	2	-Ye	ear	In	ha	lat	ior	s S	tuc	iy ·	of	Te	ılc:	6	m	g/n) ³	
	2	2	3	4	5	-5	5	<u> </u>	5	5	6	6	6	6	6	6	7	7	7	7	7	7	7	
Number of Days on Study				2																				
Number of Days on States	_	_		3		_	-	-																
	_	_	0				0																	
Carcass ID Number	5	3	2	0 7 1	1	4	0	1	6	9	1	4	8	7	0	1	5	4	2	1	4	5	8	
Ulimentary System								_																
Esophagus	+	4	- 4	· M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Gallbiadder	A	N	4 I	M	Α	A	A	A	+	Α	+	I	Α	Α	Α	+	A	A	M	+	+	+	+	
Intestine large	A	. 4	. 4	· A	Α	A	A	A	+	Α	+	+	Α	+	Α	+	+	+	+	+	+	+	+	
Intestine large, cecum	A	A	. 4	· A	Α	Α	Α	Α	+	Α	+	Α	Α	+	Α	+	Α	+	+	+	+	+	+	
Intestine large, colon				. А																+	+	+	+	
Intestine large, rectum	A	. 4	- 4	- A	Α	A	M	A	+	Α	+	A	A	+	Α	+	+	M	+	+	+	+	+	
Intestine small	А	A	. 4	· A	Α	Α	Α	A	+	A	+	Α	A	+	Α	+	Α	+	Α	+	+	+	+	
Intestine small, duodenum	А	A	. 4	- А	Α	Α	Α	Α	Α	Α	+	Α	Α	Α	Α	+	Α	+	Α	+	+	+	M	
Intestine small, ileum	А	A	A	A	Α	Α	Α	Α	+	Α	+	Α	Α	Α	Α	+	Α	+	Α	+	+	+	+	
Adenocarcinoma																								
Intestine small, jejunum	Α	A	. 4	- А	Α	Α	Α	Α	+	Α	+	A	A	+	Α	+	Α	Α	Α	+	+	+	+	
Liver	+	4	. 4	. +	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Hepatocellular carcinoma Hepatocellular adenoma					X		X						X X				x	X				x		
Hepatocellular adenoma, multiple																								
Pancreas				A																				
Salivary glands				+																		+	-	
Stomach				· A																		+	•	
Stomach, forestomach				· A																+	+	+	+	
Stomach, glandular Tooth	+	+		Α.	+	^	A	+	+	+	+	+	Α	+	+	+	+	+	+	+	+	+	+	
Cardiovascular System																								
Heart	+	+	• +	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Indocrine System																								
Adrenal gland	Α	4	. 4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Spindle cell, adenoma																								
Adrenal gland, cortex	Α	+	• +	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Adenoma																								
Adrenal giand, medulia				+										+								+		
Islets, pancreatic				ſΑ																				
Parathyroid gland				1 +																				
Pituitary gland	+	+	. 1	+	M	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	
Pars intermedia, adenoma								_						X										
Thyroid gland	+	+	- +	+	+	+	+	1	+	+	+	+	+	+	+ .	+	+	+	+	+	+	+	+	

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